(19)日本国特許庁（ＪＰ）　(12)特　許　公　報（Ｂ２）　(11)特許出願公告番号

特公平7－70911

(24)(44)公告日　平成７年(1995)７月31日

(51)Int.Cl.[6]	識別記号	庁内整理番号	ＦＩ	技術表示箇所
Ｈ０１Ｑ　21/24				
Ｈ０４Ｂ　7/10		4229－5K		

発明の数１(全　6　頁)

(21)出願番号　特願昭62－6375

(22)出願日　昭和62年(1987)１月14日

(65)公開番号　特開昭63－174413

(43)公開日　昭和63年(1988)７月18日

(71)出願人　999999999
松下電工株式会社
大阪府門真市大字門真1048番地

(72)発明者　安彦　利夫
大阪府門真市大字門真1048番地　松下電工株式会社内

(72)発明者　神田　実
大阪府門真市大字門真1048番地　松下電工株式会社内

(72)発明者　小松　幹生
大阪府門真市大字門真1048番地　松下電工株式会社内

(74)代理人　弁理士　石田　長七

審査官　村山　隆

最終頁に続く

(54)【発明の名称】　平面アンテナ

【特許請求の範囲】

【請求項１】垂直偏波と水平偏波あるいは左旋円偏波と右旋円偏波のように互いに逆偏波関係となる偏波を主偏波とする２つのアンテナ部が１つのアンテナ面上に形成され、一方のアンテナ部の受信信号に含まれる不要な逆偏波成分を他方のアンテナ部の受信信号の主偏波成分により相殺する不要偏波除去手段を備えた平面アンテナにおいて、不要偏波除去手段は、受信周波数領域において上記他方のアンテナ部の受信信号の主偏波成分の周波数特性を変化させて上記一方のアンテナ部の受信信号に含まれる不要な逆偏波成分の周波数特性に合致させるフィルタ回路と、上記一方のアンテナ部の受信信号とフィルタ回路の出力信号とを合成する合成器とを備えることを特徴とする平面アンテナ。

【請求項２】上記不要偏波除去手段が一対設けられ、互いに他のアンテナ部の受信信号のうちの不要な逆偏波成分を除去して、各アンテナ部の主偏波成分をそれぞれ取り出して成ることを特徴とする特許請求の範囲第１項記載の平面アンテナ。

【発明の詳細な説明】

［技術分野］

本発明は、放送衛星や通信衛生からの電波を地上局で受信する際に用いる平面アンテナに関するものである。

［背景技術］

近年、赤道上空36000Kmに静止する静止衛星を用いたSHF帯（12GHz帯）の衛星放送や、多目的通信衛星を用いた衛星通信が実用化されている。これらの人工衛星を用いた通信における地上局での受信アンテナとしてはパラボラアンテナが一般的であるが、アンテナが大形でありまた形状が複雑であり、しかも風圧を受けやすい形状であ

るから基礎等の施工が面倒でコストが高いという問題がある。この問題を解消するものとして屋根や壁に容易に取り付けでき、保守も容易な平面アンテナが注目されている。

ところで、水平偏波と垂直偏波あるいは左旋円偏波と右旋円偏波のように互いに、逆偏波関係を有する２種の偏波を用いれば、同一周波数の電波を利用して各偏波ごとに異なる情報を送ることが可能であるから電波の利用効率が高めることができる。しかしながら、平面アンテナは、第８図に示すように、たとえば11.0～12.0GHzでは主偏波成分（第８図上部に示す）に対する逆偏波成分（第８図下部に示す）が－９～－20dB程度であって、不要な偏波成分の抑制が十分に行なわれないという問題がある。

［発明の目的］

本発明は上述の点に鑑みて為されたものであって、その目的とするところは、交差偏波特性を改善した平面アンテナを提供することにある。

［発明の開示］

（構成）

本発明に係る平面アンテナは、垂直偏波と水平偏波あるいは左旋円偏波と右旋円偏波のように互いに逆偏波関係となる偏波を主偏波とする２つのアンテナ部が１つのアンテナ面上に形成され、一方のアンテナ部の受信信号に含まれる不要な逆偏波成分を他方のアンテナ部の受信信号の主偏波成分により相殺する不要偏波除去手段が設けられて成るものであり、一方のアンテナ部の受信信号のうち不要な逆偏波成分を他方のアンテナの受信信号の主偏波成分が相殺することにより、不要な偏波成分を除去することを前提構成とし、不要波除去手段に、受信周波数領域において上記他方のアンテナ部の受信信号の主偏波成分の周波数特性を変化させて上記一方のアンテナ部の受信信号に含まれる不要な逆偏波成分の周波数特性に合致させるフィルタ回路と、上記一方のアンテナ部の受信信号とフィルタ回路の出力信号とを合成する合成器とを設けたことを特徴とする。

すなわち、上述のようなフィルタ回路を設けることによって、広い周波数帯域に亙って不要成分を除去することができ、衛星放送電波を受信する場合のように広帯域（たとえば、11.0～12.0GHz）に用いる場合でも、周波数に応じた調整を必要とせずに不要成分を除去することができる。

（原理）

本発明の原理を第１図ないし第３図に基づいて説明する。第２図に示すように１つのアンテナ面１に２つのアンテナ部1a, 1bが形成される。両アンテナ部1a, 1bは垂直偏波と水平偏波あるいは左旋円偏波と右旋円偏波のように互いに逆偏波関係を有する偏波を主偏波成分とするように形成されている。たとえば、パッチアンテナでは、一方のアンテナ部1aに第３図（ａ）のような水平偏波用のアンテナパターン2aを形成し、他方のアンテナ部1bに第３図（ｂ）のような垂直偏波用のアンテナパターン2bを形成したり、一方のアンテナ部1aに第３図（ｃ）のような左旋円偏波用のアンテナパターン2cを形成し、他方のアンテナ部1bに第３図（ｄ）のような右旋偏波用のアンテナパターン2dを形成する。両アンテナ部1a, 1bがアンテナ面１を占有する面積は異なり、たとえば、第２図（ａ）に示すように、アンテナ面１を横に分割したり、あるいはまた第２図（ｂ）に示すように、一方のアンテナ部1aで他方のアンテナ部1bを囲むようにすればよい。第１図に示すように、面積の大きいほうのアンテナ部1aで受信された受信信号はローノイズアンプである前置増幅回路３で増幅され、合成器７（ウィルキンソン型合成器）に入力される。また面積の小さいほうのアンテナ部1bで受信された受信信号はローノイズアンプである前置増幅回路４で増幅された後、位相を反転する位相器５、減衰量の調節が可能な減衰器６を介して合成器７に入力される。すなわち、合成器７では両アンテナ部1a, 1bの受信信号が合成され、互いに逆位相の信号が相殺される。合成器７の出力はローノイズコンバータ８に入力されてより低い周波数に周波数変換される。

ここに、面積の大きいほうの第１のアンテナ部1aは水平偏波を主偏波成分として受信し、面積が小さいほうの第２のアンテナ部1bは垂直偏波を主偏波成分として受信するように設定されているとする。この場合、第１のアンテナ部1aでは水平偏波成分に対する垂直偏波成分がたとえば99対１となり、また、第２のアンテナ部1bでは垂直偏波成分に対する水平偏波成分がとたえば99対１となる。しかるに、減衰器６を調節して、第２のアンテナ部1bの受信信号の垂直偏波成分を第１のアンテナ部1aの受信信号の垂直偏波成分の略同レベルとなるようにし、合成器７で合成すれば、垂直偏波成分はほぼ相殺され、一方、第１のアンテナ部1aの受信信号のうち水平偏波成分はほとんど影響されないから、非常に高い交差偏波特性が得られるのである。また、両アンテナ部1a, 1bの面積を変え、垂直偏波成分を主偏波成分として受信するアンテナ部1bの面積を小さくしているから、減衰器６からは水平偏波成分がほとんど出力されず、第１のアンテナ部1aの受信信号のうちの水平偏波成分は第２のアンテナ部1bの受信信号による影響をほとんど受けることがないのである。以上の手法は円偏波において利用しても同等の効果を得ることができる。

（実施例１）

本実施例は、第４図に示すように、第２のアンテナ部1bの出力を前置増幅回路４で増幅した後、位相器５に入力する前にフィルタ回路９に通すようにしたものである。フィルタ回路９の特性を第５図に示すような第１のアンテナ部1aの逆偏波成分（第５図中下方の曲線。第５図中上方の曲線は主偏波成分を示す）の周波数特性に合わせて適宜設定する。すなわち、第２のアンテナ部1bの主偏

波成分に対応するフィルタ回路９の出力レベルを第１のアンテナ部1aの受信信号の逆偏波成分と同じ周波数特性に設定する。こうすれば、受信周波数とは無関係に減衰器６の減衰量を一定値として全受信周波数領域で逆偏差成分を略完全に相殺することができるのである。本実施例のように、フィルタ回路９を設けて、第２のアンテナ部1bの受信信号の主偏波成分に対応したフィルタ回路８の出力レベルを第１のアンテナ部1aの受信信号の逆偏波成分の周波数特性に合致させると、広い周波数帯域に亙って第１のアンテナ部1aの受信信号から不要な逆偏波成分を除去することができることになる。つまり、衛星放送電波を受信する場合のように平面アンテナを広帯域に用いる場合でも、周波数に応じた調整を必要とせずに不要成分を除去することができるのである。

（実施例２）

上記実施例では互いに逆偏波関係となる２種の偏波成分のうちの一方のみを取り出すようにしていたが、本実施例では両偏波成分を同時に取り出すことができるようにしたものである。すなわち、実施例２の構成を両アンテナ部1a, 1bに対称に設けたものであって、第６図に示すように、各アンテナ部1a, 1bの受信信号は前置増幅回路3, 4で増幅された後、それぞれフィルタ回路9a, 9b、位相器5a, 5b、減衰器6a, 6bを通して合成器7a, 7bに入力され、他方のアンテナ部1a, 1bの受信信号と合成されるようになっている。ここで、回路部とともにアンテナ部1a, 1bについても、第７図に示すように、両アンテナ部1a, 1bの面積が略等しくなるように分割される。この構成によれば、同時に異なる２種の偏波成分を取り出すことができ、しかも両出力には不要な逆偏波成分が含まれないのである。

［発明の効果］

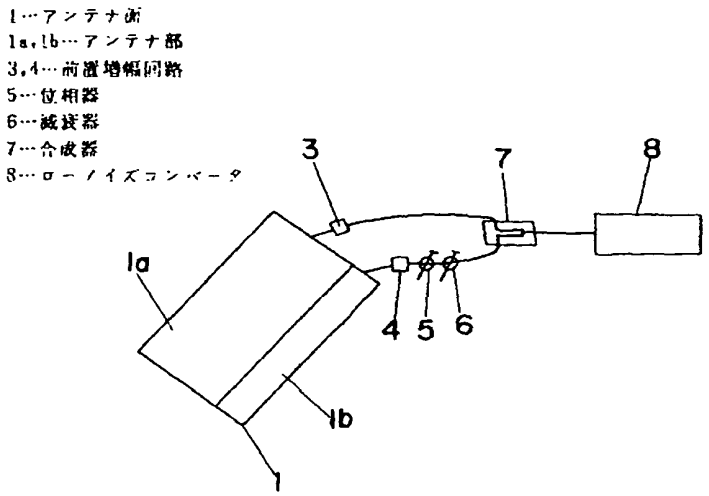
本発明は上述のように、垂直偏波と水平偏波あるいは左旋円偏波と右旋円偏波のように互いに逆偏波関係となる偏波を主偏波とする２つのアンテナ部が１つのアンテナ面上に形成され、一方のアンテナ部の受信信号に含まれる不要な逆偏波成分を他方のアンテナ部の受信信号の主偏波成分により相殺する不要偏波除去手段が設けられて成るものであり、不要な偏波成分を積極的に除去することができ、交差偏波特性が非常に向上するという利点を有するのである。とくに、不要波除去手段に、受信周波数領域において上記他方のアンテナ部の受信信号の主偏波成分の周波数特性を変化させて上記一方のアンテナ部の受信信号に含まれる不要な逆偏波成分の周波数特性に合致させるフィルタ回路と、上記一方のアンテナ部の受信信号とフィルタ回路の出力信号とを合成する合成器とを設けているから、広い周波数帯域に亙って不要成分を除去することができ、衛星放送電波を受信する場合のように広帯域（たとえば、11.0～12.0GHz）に用いる場合でも、周波数に応じた調整を必要とせずに不要成分を除去することができるという効果を奏するのである。

【図面の簡単な説明】

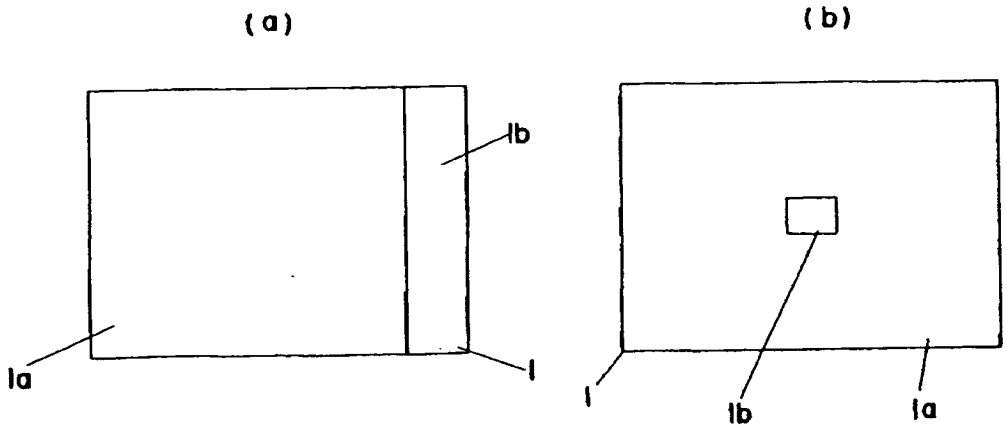
第１図は本発明の原理説明用の基本構成を示す概略構成図、第２図は同上に用いるアンテナ部の構成例を示す正面図、第３図は同上に用いるアンテナパターンの例を示す正面図、第４図は本発明の実施例１を示す概略構成図、第５図は同上の動作説明図、第６図は本発明の実施例２を示す概略構成図、第７図は同上のアンテナ部の構成例を示す正面図、第８図は従来例の動作説明図である。

１はアンテナ面、1a, 1bはアンテナ部、3, 4は前置増幅回路、５は位相器、６は減衰器、７は合成器、８はローノイズコンバータ、９はフィルタである。

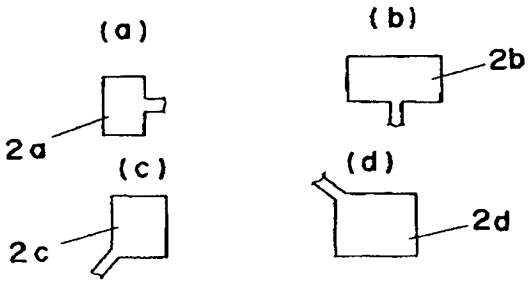
【第１図】



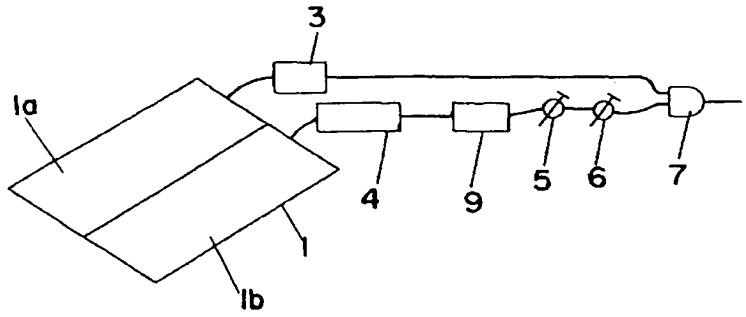
【第２図】



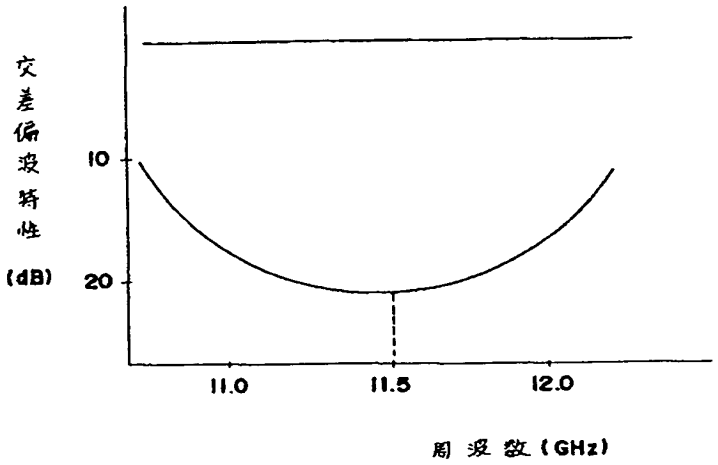
【第３図】



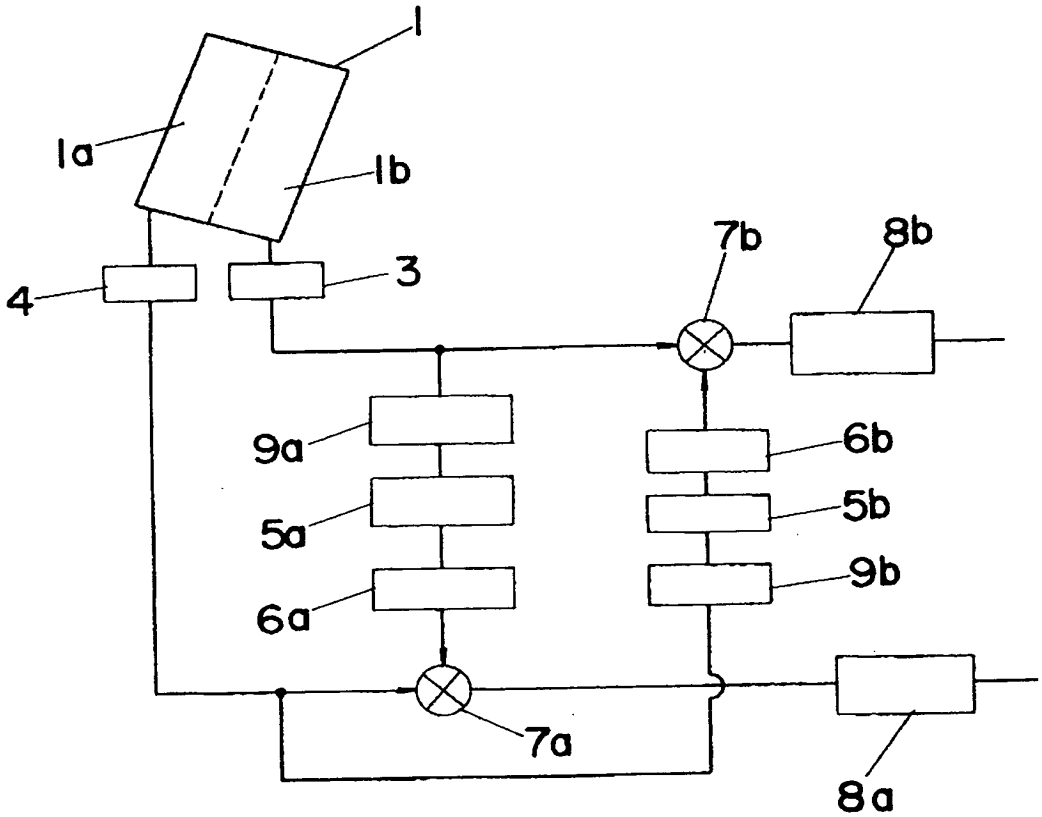
【第４図】



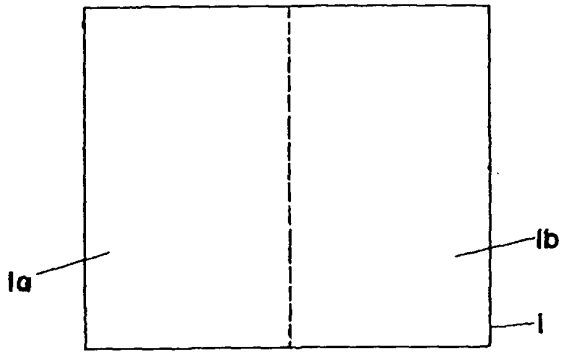
【第５図】


交差偏波特性
(dB)
10
20
11.0
11.5
12.0
周波数(GHz)

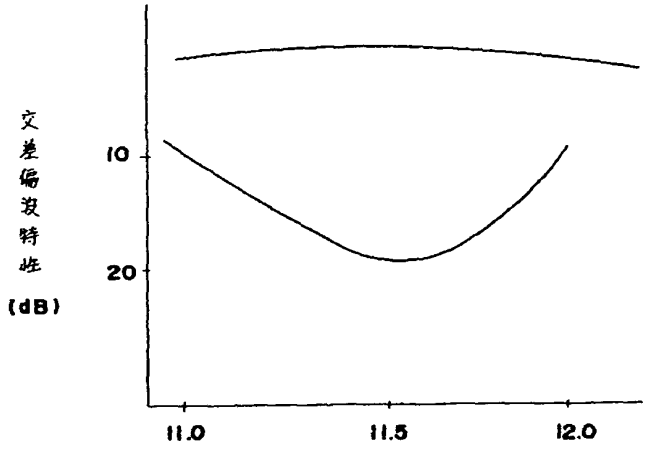
【第６図】


1
1a
1b
3
4
7b
8b
9a
6b
5a
5b
6a
9b
7a
8a

【第７図】



【第８図】



フロントページの続き

(72)発明者　井上　博夫
大阪府門真市大字門真1048番地　松下電工株式会社内

(72)発明者　宮地　伸明
大阪府門真市大字門真1048番地　松下電工株式会社内

(56)参考文献　特開　昭58－24248（ＪＰ，Ａ）

* NOTICES *

1. This document has been translated by computer.So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] The flat antenna characterized by providing the following. The two antenna sections which make the main polarization the polarization which serves as a reverse polarization relation mutually like a vertically polarized wave, a horizontally polarized wave or a levorotation circularly-polarized wave, and a dextrorotation circularly-polarized wave are formed on one antenna side. In the flat antenna equipped with an unnecessary polarization removal means to offset the unnecessary reverse polarization component contained in the input signal of one antenna section by the main polarization component of the input signal of the antenna section of another side An unnecessary polarization removal means is a filter circuit which makes the frequency characteristic of the unnecessary reverse polarization component which the frequency characteristic of the main polarization component of the input signal of the antenna section of above-mentioned another side is changed in a received-frequency field, and is contained in the input signal of above-mentioned one antenna section agree. The synthetic vessel which compounds the input signal of above-mentioned one antenna section, and the output signal of a filter circuit.
[Claim 2] The flat antenna given in the 1st term of a patent claim characterized by one pair of above-mentioned unnecessary polarization removal means being established, and removing the unnecessary reverse polarization component of the input signals of other antenna sections mutually, taking out the main polarization component of each antenna section, respectively, and changing.

[Translation done.]

* NOTICES *

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[Field of the Invention]
this invention relates to the flat antenna used in case the electric wave from a broadcasting satellite or communication health is received in an earth station.
Background of the Invention]
In recent years, the satellite broadcasting of the SHF band (12GHz band) using the geostationary satellite which stands it still in 36000km of equatorial skies, and satellite communication using the multiple-purpose communication satellite are put in practical use. Although a parabolic antenna is common as a receiving antenna in the earth station in the communication using these satellites, an antenna is large-sized, a configuration is complicated again, and since it is the configuration which is moreover easy to receive a wind pressure, there is a problem that basic construction is troublesome and cost is high. It can attach in a roof or a wall easily as what solves this problem, and the flat antenna also with easy maintenance attracts attention.
By the way, like a horizontally polarized wave, a vertically polarized wave or a levorotation circularly-polarized wave, and a dextrorotation circularly-polarized wave, mutually, if two sorts of polarization which has a reverse polarization relation is used, since it is possible to send information which is different for every polarization using the electric wave of the same frequency, the use efficiency of an electric wave can raise. However, in 11.0-12.0GHz, the reverse polarization component (shown in the octavus view lower part) to the main polarization component (shown in the octavus view upper part) is about -9--20dB, and a flat antenna has the problem that suppression of an unnecessary polarization component is not fully performed, as shown in an octavus view .
[Objects of the Invention]
The place which succeeds in this invention in view of an above-mentioned point, and is made into the purpose is to offer the flat antenna which has improved the cross polarization property.
[An indication of invention]
(Composition)
The two antenna sections which make the main polarization the polarization from which the flat antenna concerning this invention serves as a reverse polarization relation mutually like a vertically polarized wave, a horizontally polarized wave or a levorotation circularly-polarized wave, and a dextrorotation circularly-polarized wave are formed on one antenna side. It is what an unnecessary polarization removal means to offset the unnecessary reverse polarization component contained in the input signal of one antenna section by the main polarization component of the input signal of the antenna section of another side is established, and changes. When the main polarization component of the input signal of the antenna of another side offsets an unnecessary reverse polarization component among the input signals of one antenna section It considers removing an unnecessary polarization component as premise composition. for an unnecessary wave removal means The filter circuit which makes the frequency characteristic of the unnecessary reverse polarization component which the frequency characteristic of the main polarization component of the input signal of the antenna section of above-mentioned another side is changed in a received-frequency field, and is contained in the input signal of above-

mentioned one antenna section agree, It is characterized by forming the synthetic vessel which compounds the input signal of above-mentioned one antenna section, and the output signal of a filter circuit.
That is, a latus frequency band can be covered by preparing the above filter circuits, an unnecessary component can be removed, and even when using for a wide band (for example, 11.0-12.0GHz) like [in the case of receiving a satellite broadcasting electric wave], an unnecessary component can be removed, without needing the adjustment according to frequency.
(Principle)
The principle of this invention is based and explained in a view 1 or the 3rd view . As shown in a view 2, the two antenna sections 1a and 1b are formed in one antenna side 1. Both the antenna sections 1a and 1b are formed so that the polarization which has a reverse polarization relation mutually like a vertically polarized wave, a horizontally polarized wave or a levorotation circularly-polarized wave, and a dextrorotation circularly-polarized wave may be used as the main polarization component. For example, with a patch antenna, antenna-pattern 2a for horizontally polarized waves as shown in a view 3 (a) is formed in one antenna section 1a. Form antenna-pattern 2b for vertically polarized waves as shown in a view 3 (b) in antenna section 1b of another side, or Antenna-pattern 2c for levorotation circularly-polarized waves as shown in a view 3 (c) is formed in one antenna section 1a, and antenna-pattern 2d for dextrorotation polarization as shown in a view 3 (d) is formed in antenna section 1b of another side. As it differs, for example, is shown in a view 2 (a), it divides horizontally, or the area in which both the antenna sections 1a and 1b occupy the antenna side 1 should just surround antenna section 1b of another side by one antenna section 1a, as the antenna side 1 is shown in a view 2 (b) again.
As shown in a view 1, the input signal received by antenna section 1a of the one where area is larger is amplified by the front-end amplifying circuit 3 which is low noise amplifier, and is inputted into the synthetic vessel 7 (Wilkinson type composition machine). Moreover, after the input signal received by antenna section 1b of the one where area is smaller is amplified by the front-end amplifying circuit 4 which is low noise amplifier, it is inputted into the synthetic vessel 7 through the phase machine 5 which reverses a phase, and the attenuator 6 which can adjust the magnitude of attenuation. That is, with the synthetic vessel 7, the input signal of both the antenna sections 1a and 1b is compounded, and the signal of an opposite phase is offset mutually. The output of the synthetic vessel 7 is inputted into the low noise converter 8, and frequency conversion is carried out more to low frequency.
1st antenna section 1a of the one where area is larger receives a horizontally polarized wave as a main polarization component here, and 2nd antenna section 1b of the one where area is smaller presupposes that it is set up so that a vertically polarized wave may be received as a main polarization component. in this case, a horizontally-polarized-wave component [as opposed to / in 1st antenna section 1a, the vertically-polarized-wave component to a horizontally-polarized-wave component is set to 99 to 1, and / a vertically-polarized-wave component at 2nd antenna section 1b] -- ** -- it ceases and becomes ** 99 to 1 However, an attenuator 6 is adjusted, and if it is made to be set to the **** level of the vertically-polarized-wave component of the input signal of 1st antenna section 1a and the vertically-polarized-wave component of the input signal of 2nd antenna section 1b is compounded with the synthetic vessel 7, a vertically-polarized-wave component is offset mostly, and since most horizontally-polarized-wave components are not influenced, on the other hand, a very high cross polarization property will be acquired among the input signals of 1st antenna section 1a. Moreover, since area of antenna section 1b which changes the area of both the antenna sections 1a and 1b, and receives a vertically-polarized-wave component as a main polarization component is made small, a horizontally-polarized-wave component is hardly outputted and the horizontally-polarized-wave component of the input signals of 1st antenna section 1a is hardly influenced by the attenuator 6 by the input signal of 2nd antenna section 1b. Even if it uses the above technique in a circularly-polarized wave, it can acquire an equivalent effect.
(Example 1)
Before inputting this example into the phase machine 5 after it amplifies the output of 2nd

antenna section 1b by the front-end amplifying circuit 4 as shown in a view 4, it lets it pass to a filter circuit 9. The reverse polarization component of 1st antenna section 1a as shows the property of a filter circuit 9 in a view 5 (curve of the method of 5th [**] view Nakashita.) The curve of the method of 5th [**] view Nakagami is suitably set up according to the frequency characteristic which shows the main polarization component. That is, the output level of the filter circuit 9 corresponding to the main polarization component of 2nd antenna section 1b is set as the same frequency characteristic as the reverse polarization component of the input signal of 1st antenna section 1a. If it carries out like this, regardless of received frequency, the reverse deviator can be offset to abbreviation completeness in all received-frequency fields by making the magnitude of attenuation of an attenuator 6 into constant value. When a filter circuit 9 is formed and the output level of the filter circuit 8 corresponding to the main polarization component of the input signal of 2nd antenna section 1b is made to agree like this example in the frequency characteristic of the reverse polarization component of the input signal of 1st antenna section 1a, a latus frequency band will be covered and an unnecessary reverse polarization component can be removed from the input signal of 1st antenna section 1a. That is, even when using a flat antenna for a wide band like [in the case of receiving a satellite broadcasting electric wave], the unnecessary component can be removed, without needing the adjustment according to frequency.

(Example 2)

Although it was made to take out only one side of two sorts of polarization components which serve as a reverse polarization relation mutually in the above-mentioned example, it enables it to take out both the polarization component simultaneously in this example. Namely, as the composition of an example 2 is prepared symmetrically with both the antenna sections 1a and 1b and is shown in a view 6 After the input signal of each antenna sections 1a and 1b is amplified by the front-end amplifying circuits 3 and 4, it is inputted into the synthetic vessels 7a and 7b through filter circuits 9a and 9b, the phase machines 5a and 5b, and Attenuators 6a and 6b, respectively, and is compounded with the input signal of the antenna sections 1a and 1b of another side. Here, it is divided so that the area of both the antenna sections 1a and 1b may spread abbreviation etc. and may become also about the antenna sections 1a and 1b with the circuit section, as shown in a view 7. According to this composition, two sorts of simultaneously different polarization components can be taken out, and, moreover, an unnecessary reverse polarization component is not contained in both outputs.

[Effect of the Invention]

The two antenna sections which make the main polarization the polarization from which this invention serves as a reverse polarization relation mutually as mentioned above like a vertically polarized wave, a horizontally polarized wave or a levorotation circularly-polarized wave, and a dextrorotation circularly-polarized wave are formed on one antenna side. It is what an unnecessary polarization removal means to offset the unnecessary reverse polarization component contained in the input signal of one antenna section by the main polarization component of the input signal of the antenna section of another side is established, and changes. An unnecessary polarization component can be removed positively and it has the advantage that a cross polarization property improves very much. The filter circuit which makes the frequency characteristic of the unnecessary reverse polarization component which the frequency characteristic of the main polarization component of the input signal of the antenna section of above-mentioned another side is changed to an unnecessary wave removal means in a received-frequency field, and is especially contained in it at the input signal of above-mentioned one antenna section agree, Since the synthetic vessel which compounds the input signal of above-mentioned one antenna section and the output signal of a filter circuit is formed A latus frequency band can be covered, an unnecessary component can be removed, and even when using for a wide band (for example, 11.0-12.0GHz) like [in the case of receiving a satellite broadcasting electric wave], the effect that an unnecessary component can be removed without needing the adjustment according to frequency is done so.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
The outline block diagram showing the basic composition for principle explanation of this invention in a view 1, the front view showing the example of composition of the antenna section which uses a view 2 for the same as the above, The front view showing the example of the antenna pattern which uses a view 3 for the same as the above, the outline block diagram showing [4] the example 1 of this invention, Explanatory drawing of the same as the above [view / 5] of operation, the outline block diagram showing / 6 / the example 2 of this invention, the front view showing the example of composition of the antenna section of the same as the above / view / 7], and an octavus view are explanatory drawings of the conventional example of operation.
1 -- an antenna side, and 1a and 1b -- for a phase machine and 6, as for a synthetic vessel and 8, an attenuator and 7 are [the antenna section, and 3 and 4 / a front-end amplifying circuit and 5 / a low noise converter and 9] filters

---

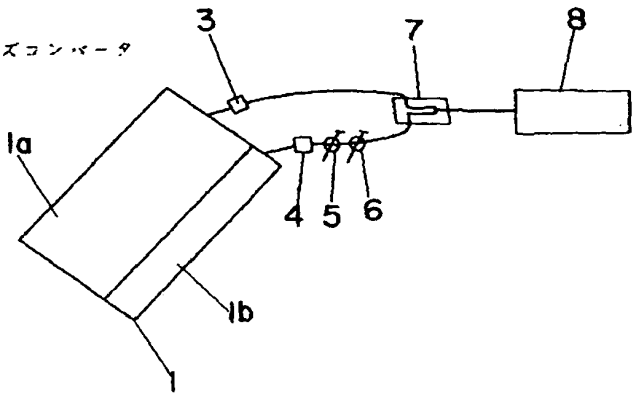
[Translation done.]

* NOTICES *

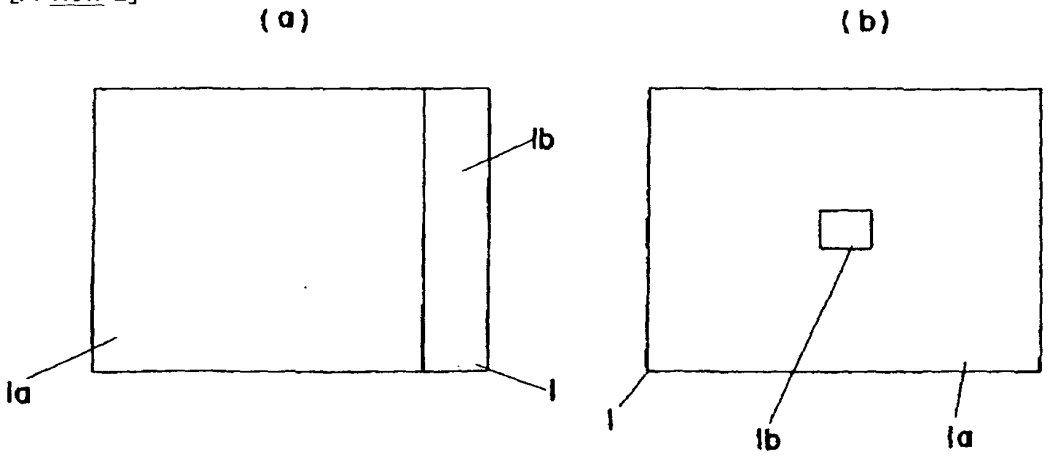
DRAWINGS

[A view 1]

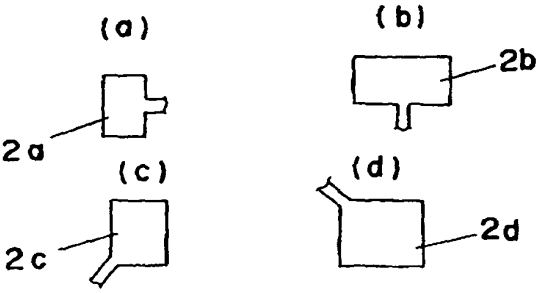
1…アンテナ面
1a,1b…アンテナ部
3,4…前置増幅回路
5…位相器
6…減衰器
7…合成器
8…ローノイズコンバータ



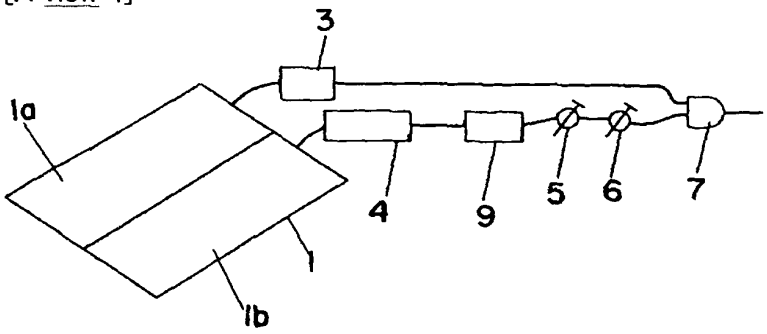
[A view 2]



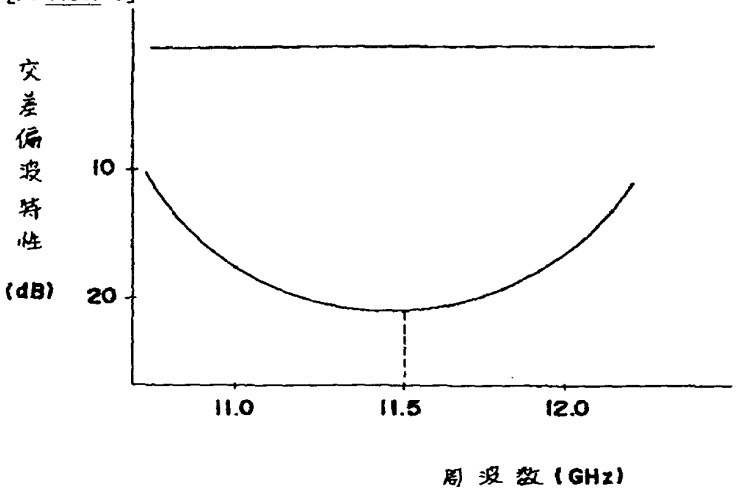
[A view 3]



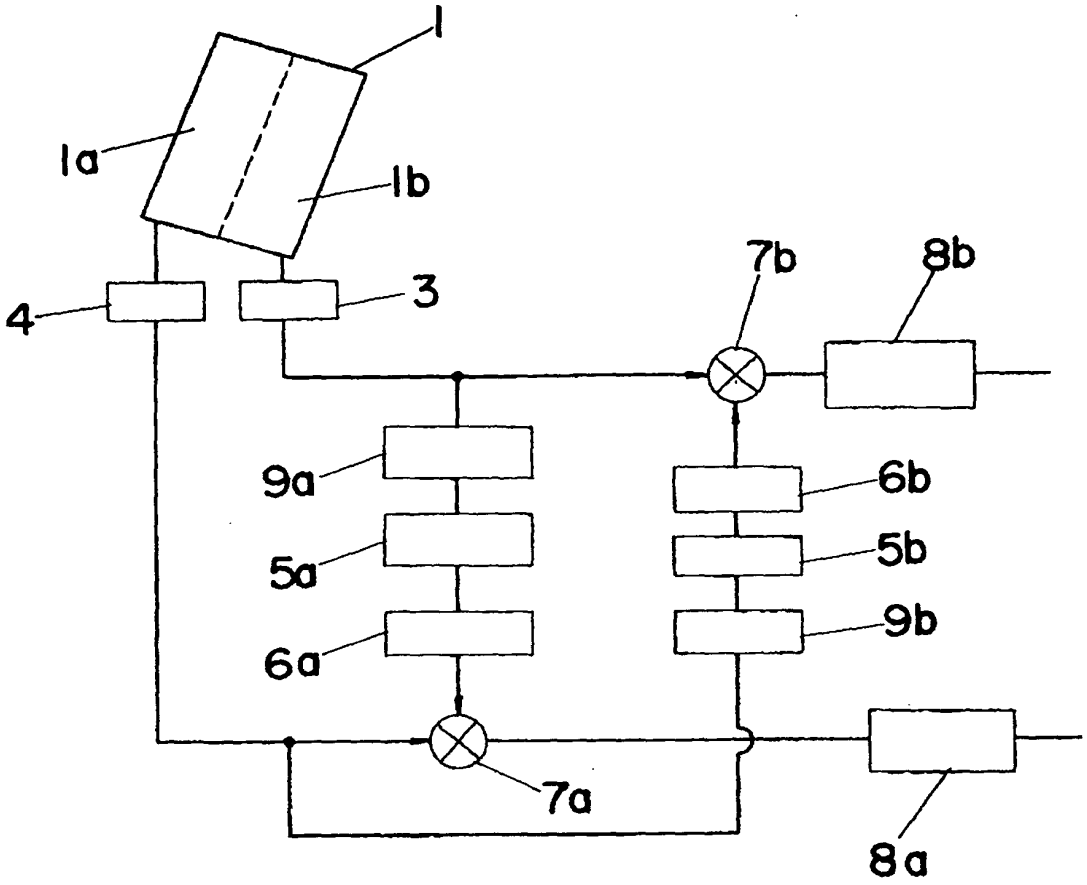
[A view 4]



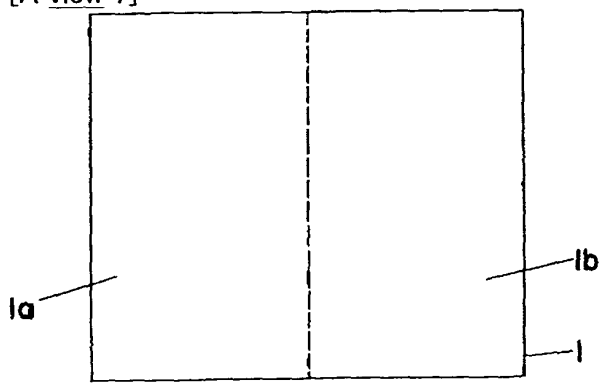
[A view 5]



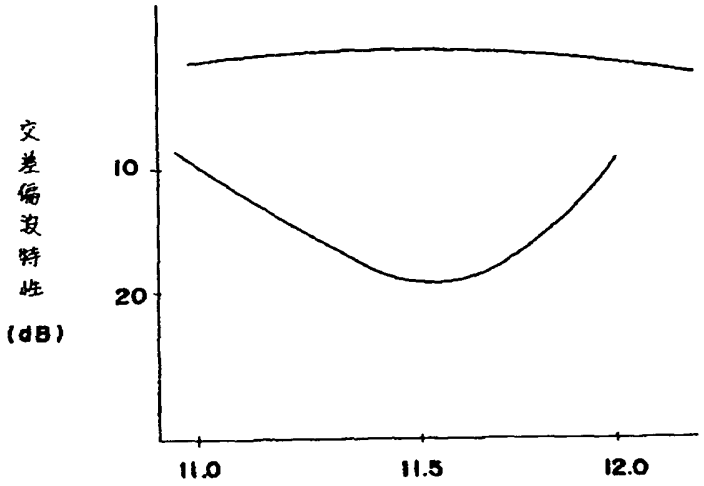
[A view 6]



[A view 7]



[An octavus view]



[Translation done.]